



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION II
 101 MARIETTA STREET, N.W.
 ATLANTA, GEORGIA 30323

Report Nos.: 50-269/88-07, 50-270/88-07, and 50-287/88-07

Licensee: Duke Power Company
 422 South Church Street
 Charlotte, NC 28242

Docket Nos.: 50-269, 50-270,
 and 50-287

License Nos.: DPR-38, DPR-47, and
 DPR-55

Facility Name: Oconee 1, 2, and 3

Inspection Conducted: March 7-11, 1988

Inspector: R. W. Newsome 3-22-88
 R. W. Newsome Date Signed

Approved by: J. J. Blake 3/23/88
 J. J. Blake, Section Chief Date Signed
 Materials and Processes Section
 Division of Reactor Safety

SUMMARY

Scope: This routine, announced inspection was in the area of Inservice Inspection (ISI) including Nondestructive Examination (NDE) procedures review, in-process examinations observations, examination data review, and equipment and personnel certification records review.

Results: No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *B. Carney, Maintenance Service
- *S. Cruse, Maintenance Services Engineer
- *B. Foster, Maintenance Superintendent
- *B. Hunt, Quality Assurance
- *R. Ledford, Quality Assurance
- *T. Matthews, Regulatory Compliance
- *B. Millsaps, Maintenance Services Engineer
- *D. Perry, Design Engineer
- *J. Reeves, Senior Engineer, Design
- *M. Tuckman, Station Manager

Other licensee employees contacted included craftsmen, engineers, technicians, security force members, and office personnel.

NRC Resident Inspectors

- P. Skinner, Senior Resident Inspector
- *L. Wert, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on March 11, 1988, with those persons indicated in Paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee.

The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspector during this inspection.

Note: An alphabetical tabulation of acronyms used in this report is listed in Paragraph 6.

3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Inservice Inspection (ISI)

The ISI activities being conducted during this outage were being accomplished by Duke Power Company (DPC) and their agent, Babcock and Wilcox (B&W) in Unit 2. B&W was performing all Ultrasonic (UT) examinations with DPC personnel assistance in some cases. B&W was conducting all the Eddy Current (EC) data acquisition activities and performing the primary data analysis while DPC personnel, with the aid of the Automated Data System (ADS), was performing a secondary independent analysis of all EC data. DPC was performing all Magnetic Particle (MT), Liquid Penetrant (PT), and Radiography (RT) examinations. Both B&W and DPC were conducting visual (VT) examinations.

a. Procedure Review, Units 1, 2, 3 (73052)

The inspector reviewed the ISI procedures indicated below to determine whether the procedures were consistent with regulatory requirements and licensee commitments. Based on the licensee's Technical Specification, the applicable code for ISI is the ASME Code, Section XI, 1980 Edition, Winter 1980 Addenda.

- (1) The following B&W and DPC procedures were reviewed in the areas of procedure approval, requirements for qualification of NDE personnel, and compilation of required records.

B&W Procedures

<u>Procedure No.</u>	<u>Title</u>	<u>Revision</u>
ISI-182	Ultrasonic Examination of Reactor Welds Joining Similar and Dissimilar Materials	1
ISI-418	Technical Procedure for the Multi-frequency Eddy Current Examination of OTSG Tubing in 177 Steam Generators using the MIZ-18	3

DPC Procedures

NDE-703	Evaluation of Eddy Current Data for Steam Generator Tubing	0
NDE-44	Ultrasonic Examination of Bolts, Studs, Bushings, and Threads in Flanges for Preservice and Inservice Inspection	7

<u>Procedure No.</u>	<u>Title</u>	<u>Revision</u>
NDE-25	Magnetic Particle Examination Procedures and Technique	12
NDE-6	Calibration/Verification of NDE Equipment	1
NDE-700	Multifrequency Eddy Current Examination of OTSG Tubing in 177 Steam Generators using the MIZ-18 (Oconee Only)	0
QA-514	Procedure for Non-Service Induced Discrepancies Found During Inservice Inspection Visual Examination of Supports	1
NDE-35	Liquid Penetrant Examination Technique (Color Contrast, Solvent Removable Method)	10
QCL-13	ISI Visual Examination VT-1	5
QCL-14	ISI Visual Examination VT-3 and VT-4	7

All procedures listed above had been previously reviewed during previous NRC inspections. During this inspection, only revisions to previously reviewed documents were reviewed.

- (2) In addition to the review above, B&W UT Procedure ISI-182 and DPC Procedure NDE-44 was reviewed in the area of technical content relative to: type of apparatus, extent of coverage including beam angles and scanning techniques, calibration requirements, search units, DAC curves, transfer requirements, reference level for monitoring discontinuities, method of demonstrating penetration, levels for evaluating and recording indications, and acceptance standards.
- (3) DPC MT Procedure NDE-25 was also reviewed for technical content relative to: examination method, use of color contrast particles, surface preparation, surface temperature, particle suspension, viewing conditions, examination directions and overlap, prod spacing, prod magnetizing current, and acceptance criteria.
- (4) DPC PT Procedure NDE-35 was also reviewed for technical content relative to: method consistent with ASME code, specification of brand names of penetrant materials, specification of limits for sulfur and total halogens for materials, pre-examination surface preparation, minimum drying time following surface cleaning,

penetrant application and penetration time, temperature requirements, solvent removal, method of surface drying, type of developer and method of application, examination technique, technique for evaluation, acceptance standards, and requalification requirements.

- (5) B&W Eddy Current Procedure ISI-418 and DPC procedures NDE-700 and NDE-703 were reviewed for technical content relative to: multichannel examination unit, multichannel examination indication equipment is specified, maximum examination sensitivity, material permeability, method of examination, method of calibration and calibration sequence, and acceptance criteria.
- (6) The inspector reviewed the visual examination Procedures QCP-13 and QCL-14 to determine whether they contained sufficient instructions to assure that the following parameters were specified and controlled within the limits permitted by the applicable code, standard, or any additional specification requirement; method - direct visual, remote visual or translucent visual; application - hydrostatic testing, fabrication procedure, visual examination of welds, leak testing, etc.; how visual examination is to be performed, type of surface condition available; method or tool for surface preparation, if any; whether direct or remote viewing is used; special illumination, instruments, or equipment to be used, if any; sequence of performing examination, when applicable; data to be tabulated, if any; acceptance criteria is specified and consistent with the applicable code section or controlling specification; and report form completion.

b. Observation of Work and Work Activities Unit 2 (73753)

The inspector observed work activities and reviewed certification records of equipment, materials, and NDE personnel which had been and will be utilized during the required ISI examinations during this outage. The Observations and reviews conducted by the inspector are documented below.

(1) Ultrasonic (UT) Examination

- (a) The inspector observed the in-process ultrasonic examinations indicated below, including instrument calibration activities. The observations were compared with the applicable procedures and the Code in the following areas: availability of and compliance with approved Nondestructive Examination (NDE) procedure; use of knowledgeable NDE personnel; use of NDE personnel qualified to the proper level; type of apparatus used; extent of coverage of weldment; calibration requirements; search units; beam angles; DAC curves; reference level for

monitoring discontinuities; method of demonstrating penetration; limits of evaluating and recording indications; recording significant indications; and, acceptance limits.

<u>Item No.</u>	<u>Weld No.</u>
B05.050.006	2-PD-B1-2
B05.050.006A	2-PD-B1-2
B09.012.025	2-PD-B1-53LO
B09.012.026	2-PD-B1-53LI

- (b) The following listed ultrasonic equipment and materials certification records were reviewed:

Ultrasonic Instrument

<u>Manufacturer/Model</u>	<u>Serial No.</u>
Panametrics/EPOCH 2002	12089
Ultrasonic transducers - E15769, H26705, M18425	
Ultrasonic Calibration Blocks - 40350 & 40397	
Ultrasonic Couplant-Ultragel Batch No. 8551	

(2) Liquid Penetrant (PT) Examination

- (a) The inspector observed the in-process liquid penetrant examination indicated below. The observation was compared with the applicable procedures and the Code in the following area; specified method, penetrant materials identified; penetrant materials analyzed for halogens and sulfur; acceptable pre-examination surface; drying time; method of penetrant application; penetration time; surface temperature; solvent removal; dry surface prior to developing; type of developer; examination technique; evaluation technique; and reporting of examination results.

<u>Item No.</u>	<u>Description</u>	<u>Weld No.</u>
B09.021.039	B-1 Letdown Line	2-51A-35-1-20

- (b) The inspector reviewed the below listed liquid penetrant materials certification records to ascertain if the sulfur and halogen content of the material was within acceptable content limits.

<u>Materials</u>	<u>Batch Number</u>
Liquid Penetrant	84H015
Cleaner/Remover	85M056, 86H030, 87C048
Developer	85H029, 85C055

(3) Magnetic Particle (MT) Examination

- (a) The inspector reviewed documentation indicating that a lift test had been performed on MT yokes with Serial Nos. OCQA-200 and OCQA-88, using a ten pound steel plate. The lift tests were performed satisfactorily.
- (b) The inspector reviewed material certification records for magnetic particles with batch numbers 84K005 and 87D062.

(4) Eddy Current (EC) Examination of Steam Generator (SG) Tubes

ISI activities during this outage included the eddy current examination of tubes in "A" & "B" SGs. Data acquisition and primary data analysis were being performed by B&W. The approved B&W procedure ISI-418 and related references are the governing documents.

- (a) Examination was being performed with a multi-frequency technique and utilized the computerized MIZ-18 EC Examination System to analyze tube integrity. Discussions with the licensee disclosed that as of March 11, 1988 there had been 9500 tubes in SG-A probed with 32 tubes required to be plugged. In SG-B, 9500 tubes had been probed with 13 required to be plugged.
- (b) During the observation of the examination activities, the inspector observed, by remote T.V. camera, the probing of the tubes listed below. This data was being collected using the eddy-360 probe.

SG-B

<u>Row</u>	<u>Tube No.</u>
102	113
102	118
109	82
123	98

- (c) Certification records for EC calibration standards 49154 and 49155 were reviewed for material type, correct fabrication, and artificial flaw location/size.

- (d) The inspector observed the primary evaluation of the EC examination data for the tubes listed below. The observations were accomplished to verify: use of approved procedure and equipment; use of knowledgeable examination personnel with proper qualifications; proper recording of examination data; proper examination frequencies; calibration standard adequacy; and performance of calibration at proper intervals.

<u>SG-A</u>		<u>SG-B</u>	
<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>
98	25	75	3
117	22	77	8
104	40	77	29
109	34	14	3
113	32	105	119
118	25	107	116
110	39		
134	14		
94	56		

Note: These tubes were being evaluated using the eddy-360 data.

- (e) The inspector observed the secondary evaluation of the EC examination data for the tubes listed below. These evaluations were being conducted by DPC personnel with the aid of the ADS analyzer. The data is first feed through the ADS and this system highlights and stores any indications that exceed the predetermined indication signal voltage and/or indication signal phase angle parameters that have been established. Once the data is passed through the ADS all indications noted by the system are then manually reviewed for final determination and disposition by a qualified EC data analyst. All of the data listed below is from SG-A.

<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>
133	37	111	66	16	72
85	65	148	39	39	68
85	66	143	49	13	52
106	61	74	80	36	63
90	66	53	116	12	22
119	58	52	117	66	15
94	68	51	117	77	23

- (5) The inspector reviewed the qualification documentation for the below listed B&W and DPC examiners in the following areas: employer's name; person certified; activity qualified to

perform; effective period of certification; signature of employer's designated representative; basis used for certification; and annual visual acuity, color vision examination, and periodic recertification.

Method-Level

<u>Company</u>	<u>Examiner</u>	<u>UT</u>	<u>PT</u>	<u>MT</u>	<u>RT</u>	<u>EC</u>	<u>VT</u>	
B&W	WJP	II	-	-	-	-	-	
	JCW	II	-	-	-	-	-	
	GRL	-	-	-	-	I	-	
	GSM	-	-	-	-	II	-	
	JDM	-	-	-	-	I	-	
	PRC	-	-	-	-	II	-	
	MSL	-	-	-	-	II	-	
	JMB	-	-	-	-	III	-	
	ACG	-	-	-	-	IIA	-	
	MJK	-	-	-	-	IIA	-	
	JSS	-	-	-	-	IIA	-	
	DPC	TBA	-	-	-	-	I	-
		GGB	II	-	II	-	IIA	-
		GB	-	-	-	-	I	-
MWB		-	-	-	-	IIA	-	
TMH		-	-	-	-	IIA	-	
WKD		-	-	-	-	IIA	-	
JWR		-	II	-	I	-	-	
RR		-	-	-	-	-	II	
HAD		-	II	-	II	-	-	
GJM		II	II	II	-	-	II	
GLB		-	-	-	II	-	-	
ADG		-	II	-	I	-	-	
CGF		-	II	-	II	-	-	
RPB		-	II	-	I	-	-	
DLR	II	-	-	II	-	-		
AEB	-	-	-	-	-	II		
CFR	-	-	-	-	-	II		
PWW	-	-	-	-	-	II		
JNT	-	-	-	-	-	II		

c. Inservice Inspection, Data Review and Evaluation, Unit 2 (73755)

- (1) Records of completed nondestructive examinations were selected and reviewed to ascertain whether: the method(s), technique and extent of the examination complied with the ISI plan and applicable NDE procedures; findings were properly recorded and evaluated by qualified personnel; programmatic deviations were recorded as require; personnel, instruments, calibration blocks and NDE materials (penetrants, couplants) were designated. Records selected for this review are listed below.

<u>ISI Item No.</u>	<u>Item/Weld No.</u>	<u>Method</u>
B05.050.006B	2PDB1-2	PT
B05.051.008	2PDB1-11	PT
B07.070.012	Studs (B7) Nuts (2H)	VT
B09.011.080A	2PHB-12	MT
B09.011.101A	2PSL-1	PT
B09.011.211A	2-51A-30-01	PT
B09.012.025A	2PDB1-53LO	MT
B09.021.051	2-51A-145-01	PT
B09.040.004	2-50-129-13A	PT
C05.011.041	2-53B-19.2-100	PT
C05.021.052A	2-03-20WG91-H	MT
C05.021.053A	2-03-18.2-35	MT
C05.021.206A	2-03-67-14	MT
C03.040.006	2-01A-R3	MT
C05.011.555	2-03A-13-01	MT
B09.011.211	2-51A-30-01	UT
E04.001.001	2PDA1-47	UT
B09.011.101	2PSL-1	UT
D02.020.005	2-01A-DE042	VT
D02.020.057	2-03A-0800	VT
F1.03.129	*2-03A-SR21	VT
F1.03.148	*2-03A-1420	VT
F1.03.316	2-03A-H93	VT

*These items were found to be deficient. Work order requests were issued to correct the deficiencies. The inspector reviewed Work Order Requests 52646G and 52650G.

- (2) The inspector selected for review EC examination data results from tubing which had been analyzed. This review was conducted in order to assess the severity of tubing degradation and to determine where the majority of the degradation was occurring along the tube length. The tubes selected for review are listed below:

<u>Row</u>	<u>SG-A</u>	<u>Tube</u>	<u>Row</u>	<u>SG-B</u>	<u>Tube</u>
14		8	25		4
66		15	63		128
75		7	75		20
75		8	76		102
77		3	77		3
96		127	77		17
101		123	114		4
108		115	118		52
108		118	113		5

110	115	64	4
113	113	65	5
137	3	73	45
81	15	78	16
82	124	78	116
107	105	78	117
140	69	126	78
136	40	126	79
145	2	141	18
126	11	75	3
		77	8
		77	29

- (3) The below listed radiographic film was reviewed to determine if radiographic quality was in accordance with the applicable procedure and Code requirements, and to specifically verify the following: penetrometer type, size, and placement; penetrometer sensitivity; film density and density variation; film identification; film quality; and weld coverage.

<u>Item No.</u>	<u>Weld No.</u>	<u>View</u>
B12.010.002	2RCP-2A2	276-1, 1-282, 288-294 282-288, 36-48, 60-72, 144-156, 192-204
C05.021.053	2-03-18.2-35	0-1, 2-3, 3-4, 4-5
C05.021.206	2-03A-67-14	0-1, 1-2, 5-0
C05.021.202	2-03A-10-61	1-2, 2-3, 4-5
C05.021.117	2-01A-5.4-36	1-2, 2-3, 3-4, 5-0
C05.021.062	2-03-18.1-03	0-1, 1-2, 2-3, 4-5

The inspector reviewed the examination records for the above listed welds to determine compliance with procedure requirements for examination records and to determine if disposition of the welds radiographed was in compliance with the applicable Code and specification requirements.

- (4) The inspector compared current examination results with randomly selected previous examination results. No discrepancies were noted but in some cases, the EC results reported in the August 1986 examination and the current examination did differ. A computer review indicated that all tubes inspected during August 1986 were re-examined during this outage and the differences were attributed to a more conservative reporting criteria during the current outage.

Within the areas inspected, no violations or deviations were identified.

6. Acronyms

ADS	-	Automated Data System
ASME	-	American Society of Mechanical Engineers
B&W	-	Babcock and Wilcox
DAC	-	Distance Amplitude Curve
DPC	-	Duke Power Company
DRP	-	Demonstration Power Reactor
EC	-	Eddy Current
ISI	-	Inservice Inspection
MT	-	Magnetic Particle
NDE	-	Nondestructive Examination
NRC	-	Nuclear Regulatory Commission
OTSG	-	Once Through Steam Generator
PT	-	Liquid Penetrant
QA	-	Quality Assurance
RT	-	Radiography
SG	-	Steam Generator
T.V.	-	Television
UT	-	Ultrasonic
VT	-	Visual